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An Alternative Vision for CBM+ for the Air Force

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A review of the Condition-Based Maintenance Plus (CBM+) Web site¹ and the Air Force plan to implement it has sparked a careful appraisal of the implementing strategies. Having a clear strategy and metric to achieve the present CBM+ vision is axiomatic to success. The following highlights an alternative vision to what the Air Force currently plans to pursue, gleaned from the pertinent Web site.

The first problem concerns the definition of CBM+. One notes from the study² performed to address CBM+ that the definition comprises 72 words in three sentences, plus an additional sentence yet to be defined. The gist of the definition is to perform maintenance (Mx) only when needed, as indicated by sensors, portable equipment, and other software-intensive *tools*. The underlying assumption here is that *expert knowledge* can be programmed into successive generations of these tools on a timely and cost-effective basis.

Since CBM+ is defined in the Deputy Under Secretary of Defense, Acquisitions and Logistics memorandum (same subject), November 2002, in terms of reliability-centered maintenance (RCM), perhaps a more pragmatic approach would be to use SAE Standard JA1011, Evaluation Criteria for Processes, as a guide. As in the present initiative in the Air Force propulsion community to implement RCM, the wider Air Force Mx community should mimic an end-oriented strategy. Succinctly stated, Air Force propulsion RCM is a structured methodology applied to engine components to maximize operational availability, at least life-cycle cost, consistent with minimizing consequences of failures. One can readily see that the former definition is whiz-bang technology-oriented (sensors, s/w, palm-pilots, and so on). The latter is aligned with private industry's reckoning to maximize utility at the least cost by focusing on consequences of failures, not how quickly a removeand-replace (R&R) action can happen.

In the propulsion world, having sufficient safe and reliable war-readiness engines to fight a major two-theater war scenario—available at least LCC—is the overriding goal. One accomplishes such an operational requirement, initially, by increasing the time on wing of each engine via planned maintenance while pursuing the elusive cost-per-engine operating-hour metric for each type-model-series engine. The present CBM+ study and Air Force Web site intend a different approach, apparently. Said approach seems to emphasize shorter R&R actions via increasingly integrated

systems' fault isolation technology. The assumption behind this strategy may be that more software and hardware integration is better. The logical conclusion of this approach is to separate the maintainers and their hard-won technical skills from the R&R system, essentially making the R&R function robot-like. Perhaps this is a logical outgrowth of drastically shrinking personnel numbers in outyear Air Force budgets for Mx communities.

Now, consider the fact that this Web site study is almost mute on CBM+ education. Although training appears quite often in the study, the context is always in terms of simulators, hands-on with portable troubleshooting devices, and so forth. Contrast that omission to the following. In the present propulsion RCM world, Air Force Senior Executive Service (SES) members deliberately chose to "stand up RCM in the proper manner." This choice involved funding Air Force Institute of Technology (AFIT) School of Professional Continuing Education instructors to travel to depot sites where propulsion engineers reside, as well as active, reserve, and Air National Guard bases where the maintainers perform field maintenance on engines. Called RCM course directors, these teachers provide tailored education appropriate to accomplishing the end goals of the SESers by conducting courses at 77 bases and 2 depots. The cost per student has been held very close to \$100 per student the last 3 fiscal years, while providing education on a different tool at each respective location pertinent to the activities and responsibilities of each student. This education exceeds training because one of the goals of these SES-sponsored RCM curricula is to change the culture of the propulsion community from a reactive maintenance philosophy to a proactive planned maintenance philosophy. This approach stands in stark contrast to the Air Force Web site's apparent approach of business as usual, only faster and with less human interaction. To summarize, tailored education is a very long-term approach to changing the culture and is governed by the speed at which growing the tools increasingly fine-tunes the tempo of engine availability to the air expeditionary forces.

The author's intent is not to criticize the present CBM+ efforts of the Air Force. The author wants to spark some meaningful discussions in future editions of Air Force publications over what the role of CBM+ is for the Air Force in the long run and how best to accomplish this goal. We have time to ensure that we are pursuing carefully thought-out approaches to what we covet as

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logistics community before adopting a commercially provided ERP system.⁴⁵

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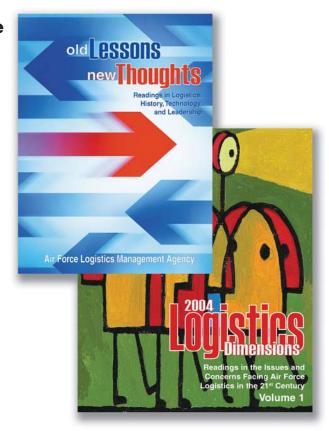
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